Remarks/Arguments

Claims 1 – 12 are pending in the application. Claims 1 and 9 are independent.

In the present response, claims 1 – 12 are amended for non-statutory reasons: to correct one or more informalities, and/or to replace European-style claim phraseology with American-style claim language. No new matter is added.

Rejection of claims 9, 10 and 12 under 35 U.S.C. 102(e) over Turaga et al. (US 2004/0008785 A1, hereinafter referred to as "Turaga")

Applicants submit that for at least the following reasons, claims 9, 10 and 12 are patentable over Turaga.

For example, claim 9, in part, recites:

> "*at least one reverse calibration operation for pictures selected from the high and low frequency decoded pictures, the selection of the pictures and the number of reverse operations being dependent on an element of information associated with the coded picture.*" (Emphases added)

In the Office Action, page 4, the Office concedes that Turaga does not specifically disclose a selection step to select the low (L) or high (H) frequency pictures. Since the calibration operation is carried out for the selected picture, Turaga cannot have a calibration operation for a picture selected because the prerequisite selection operation is missing in Turaga. Therefore, Turaga does not disclose the feature: at least one reverse calibration operation for pictures selected from the high and low frequency decoded pictures.

Furthermore, Turaga is related to wavelet based coding utilizing motion compensated temporal filtering that produces L-frames with both filtered and unfiltered regions ([0002], emphasis added). A first region of a first frame is matched to a second region in a second frame, and a first partly encoded frame is produced including a difference between the first and the second region. A second partly encoded frame is produced including pixel values of either the first or the second region ([0007]). In order to produce a L-frame, Turaga teaches a temporal filtering unit which determines for each of two corresponding matched regions in each pair of

frames whether it should be an unfiltered A-region or should be filtered as an L-region. For each of the two corresponding matched regions that is determined to be a L-region, the temporal filtering unit calculates the average of the pixel values of the two regions. According to Turaga, the average of these two regions may be multiplied by a scaling factor, e.g. the square root of two ([0025]).

Thus, according to Turaga L-regions of L-frames are scaled, the L-frames further comprising A-regions which are not scaled. The scaling taught by Turaga is applied to regions of frames, selectively, but not to pictures. Therefore, Turaga does not disclose a calibration operation for pictures selected.

Turaga, paragraphs [0040] – [0042], discloses:

> [0040] An inverse temporal filtering unit 22 is included to reconstruct the partially decoded frames from the spatial recomposition unit 20. During operation, the inverse temporal filtering unit 22 processes each pair of H and L-frames included in each GOP, as follows. First, corresponding regions in each pair of H and L-frames are retrieved according to the motion vectors and frame numbers provided by the entropy decoding unit 16. According to the present invention, each of the corresponding regions retrieved will include either an L-region or a A-region from an L-frame and a region from an H-frame. As previously described, the A-region represents the unfiltered pixel values of one of two corresponding matched regions between a pair of frames, the L-region represents the average of pixel values of the two corresponding matched regions and the region from the H-frame represents the difference between the two corresponding matched regions. Further, each of the retrieved corresponding regions are divided by the same scaling factor used on the encoder side.
>
> [0041] For each L-region included in the L-frames, a sum and difference is calculated for the pixel values of each L-region and the corresponding region in the H-frame. Each sum and difference is then divided by another scaling factor. An example of a suitable scaling factor would be a value of two (2). Each scaled sum and difference is then placed in the appropriate reconstructed frame.
>
> [0042] For each A-region included in the L-frames, it will be passed along unchanged to the appropriate reconstructed frame after being initially scaled, as described above. As previously described, each L-frame may have an associated header or flag that indicates whether a particular A-region was selected from either a reference frame or source frame. Thus, each A-region may be placed in the appropriate reconstructed frame according to the information in the associated

> header or flag. Alternatively, the A-region may be placed in the appropriate frame according to a predetermined convention. For example, it could be decided to select all A-regions from a reference frame for the whole video sequence. (Emphases added)

Turaga describes a single scaling operation applying the same scaling factor to A-regions and two scaling operations applying the same scaling factor, e.g., a value of two (2) to sums and differences calculated for pixel values of each L-region comprised in the L-frame and the corresponding region in the H-frame. Although Turaga discloses that each L-frame may have an associated header or flag that indicates whether a particular A-region was selected from either a reference frame or source frame, such information is only related to which reconstruction frame to place in the A-region, Turaga does not disclose that the number of operations depends on the information in the associated header or flag. Since Turaga does not disclose a selection operation as already discussed above, the selection of pictures would not be dependent on an element of information associated with the coded picture.

In contrast, applicant's claim 9 requires the selection of the pictures and the number of reverse operations being dependent on an element of information associated with the coded picture. Therefore, Turaga does not disclose the above claimed features.

In view of at least the foregoing, Applicants submit that claim 9 is patentable over Turaga. Claims 10 and 12 depend from and inherit all the features of claim 9. Therefore, claims 10 and 12 are patentable for at least the reason that they respectively depend from claim 9, with each dependent claim containing further distinguishing features.

Withdrawal of the rejection of claims 9, 10 and 12 under 35 U.S.C. 102(e) is respectfully requested.

Rejection of claims 1 – 12 under 35 U.S.C. 103(a) over Turaga in view of Zhang et al. (US 7321625 B2, hereinafter referred to as "Zhang")

Applicants submit that for at least the following reasons, claims 1 – 12 are patentable over the combination of Turaga and Zhang.

For example, independent claim 1, in part, recites:

"the low frequency pictures (L) obtained being thus scaled to be adapted, at the energy level, to the pictures obtained by the said motion compensated temporal filtering, the method comprising,

among the low frequency picture and the final high frequency decomposed pictures obtained at the end of the analysis: a selection operation to select the low (L) or high (H) frequency pictures obtained by intra coding of a picture at a lower decomposition level with the additional condition, for the high frequency pictures, that this picture is derived itself from an intra coding, and

a calibration operation to calibrate the selected pictures by carrying out at least one reverse operation of the scaling operation, for their coding." (Emphases added)

As already discussed above, Turaga fails to disclose the selection operation and consequently cannot have a calibration operation to calibrate the selected pictures. Furthermore, according to Turaga, L-regions of L-frames are scaled, the L-frames further comprising A-regions which are not scaled. The scaling taught by Turaga is applied to regions of frames, selectively, but not to pictures. Therefore, Turaga does not disclose that: "*the low frequency pictures (L) obtained being thus scaled.*" Furthermore, the scaling factor taught by Turaga is applied to L-regions, i.e. filtered regions. In contrast to that, the low frequency pictures scaled according to claim 1 are those obtained by intra-mode coding in order these pictures "*to be adapted, at the energy level, to the pictures obtained by the said motion compensated temporal filtering,*" as explicitly recited in claim 1.

Applicants submit that Zhang does not cure the deficiencies present in Turaga as discussed above.

Although Zhang apparently teaches that redundancy in intra coded pictures is exploited in wavelet coding (column 6, lines 45 – 53), Applicants respectfully submit that the claimed selection operation among the high and low frequency pictures obtained at the end of the analysis for selecting pictures obtained by intra coding does not serve the purposes for exploiting redundancy in intra coded pictures by wavelet coding. Instead, as explicitly claimed in independent claim 1, the selected pictures are selected for carrying out in a calibration operation at least one reverse operation of a scaling operation, for calibrating the selected pictures for their

coding. There is no selection operation to select low or high frequency pictures obtained by intra coding of a picture in Zhang, either.

Therefore, the combination of Turaga and Zhang does not teach or suggest the scaling of low frequency pictures obtained by intra-coding to be adapted, at the energy level, to the pictures obtained by motion compensated temporal filtering. In addition, the combination of Turaga and Zhang does not teach or suggest, among the low frequency picture and the final high frequency decomposed pictures obtained at the end of the analysis: a selection operation to select the low (L) or high (H) frequency pictures obtained by intra coding of a picture at a lower decomposition level with the additional condition, for the high frequency pictures, that this picture is derived itself from an intra coding. Furthermore, since both Turaga and Zhang fail to teach or suggest a selection operation, consequently, the calibration operation to calibrate the selected pictures would be missing in the combination of Turaga and Zhang.

In view of at least the foregoing, Applicants submit that claim 1 is patentable over the combination of Turaga and Zhang. Similarly, independent claim 9 is patentable over the combination of Turaga and Zhang for at least the similar reasons discussed above for claim 1. Claims 2 – 8 and 10 – 12 respectively depend from and inherit all the features of either claim 1 or 9. Therefore, claims 2 – 8 and 10 – 12 are patentable over the combination of Turaga and Zhang for at least the reason that they respectively depend from either claim 1 or 9, with each dependent claim containing further distinguishing features.

Conclusion

Having fully addressed the Examiner's rejections it is believed that, in view of the preceding amendments and remarks, this application stands in condition for allowance. Accordingly then, reconsideration and allowance are respectfully solicited. If, however, the Examiner is of the opinion that such action cannot be taken, the Examiner is invited to contact the applicants' attorney at (609) 734-6817, so that a mutually convenient date and time for a telephonic interview may be scheduled.

Respectfully submitted,
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